INSTRUCTIONS

FOR

Weights and Measures Officials

OF THE

STATE OF INDIANA

Relative to the Inspection, Testing and Sealing of Weights, Scales, Measures and Apparatus Used in Trade

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INTRODUCTION.

The new Weights and Measures Law, passed March 6, 1911, and amended March 10, 1913, designates the State Food and Drug Commissioner, State Commissioner of Weights and Measures and charges him with the enforcement of the Weights and Measures Law. In complying with Chapter 161 of the Acts of 1913 the following pages have been prepared for the guidance and instruction of Weights and Measures officials. The following is the Weights and Measures Law of Indiana as amended by the last General Assembly:

THE WEIGHTS AND MEASURES LAW.

(Chapter 263, Acts 1911. Approved March 6, 1911. Amendment Chapter 161, Acts 1913. Approved March 10, 1913.)

AN ACT concerning scales, weights and measures, providing penalties for the violaation thereof and for the selling or offering for sale of articles below standard weight or measure.

Weights and Measures—Standards.

Section 1. Be it enacted by the General Assembly of the State of Indiana, That the standard weights and measures furnished by the government of the United States in accordance with the joint resolution of Congress approved June fourteenth, eighteen hundred and thirty-six, and any additions thereto and renewals thereof certified to by the United States bureau of standards and weights, measures, balances and apparatus as may be added by the State Commissioner of Weights and Measures and verified by the United States bureau of standards, shall be the standards by which all State, county and city standards shall be tried, proved and sealed.

State Commissioner—Custody of Standards—Duties.

Sec. 2. The State Food and Drug Commissioner shall be the State Commissioner of Weights and Measures. The State Commissioner of Weights and

Measures shall take charge of the standards adopted by this article as the standards of the State; cause them to be kept in a fireproof building belonging to the State, from which they should not be removed except for repairs or for certification, and take all other necessary precautions for their safe keeping. He shall maintain the State standards in good order and shall submit them once in ten years to the national bureau of standards for certification. He, or his deputies or inspectors by his direction, shall correct the standards of the several cities and counties and as often as once in two years compare the same with those in his possession, and where not otherwise provided by law he shall have a general supervision of the weights, measures and measuring and weighing devices of the State, and in use in the State. He shall upon the written request of any citizen, firm, corporation or institution of the State, test or calibrate weights, measures, weighing or measuring devices and instruments or apparatus used as standards in the State. He, or his deputies or inspectors by his direction shall at least once annually test all scales, weights and measures used in checking the receipt or disbursement of supplies in every institution under the jurisdiction of the State Board of Charities and he shall report in writing his findings to the executive officer of the institution concerned. The State Commissioner of Weights and Measures shall keep a complete record of the standards, balances and other apparatus belonging to the State and take receipt for the same from his successor in office; he shall annually during the first two weeks of January make to the Governor a report of the work done by his office; he or his deputies or inspectors at his direction, shall at least once in two years visit the various cities and counties of the State which have appointed sealers of weights and measures in order to inspect the work of the local sealers, and in the performance of such duties he may inspect the weights, measures, balances or any other weighing or measuring appliances of any person, firm or corporation. The State Commissioner of Weights and Measures shall issue from time to time regulations for the guidance of county and city sealers and the said regulations shall govern the procedure to be followed by the aforesaid officers in the discharge of their duties.

County or City Inspectors—Salary—Duties.

Sec. 3. The board of county commissioners of every county of 50,000 population or more shall, and the board of county commissioners in counties of less than 50,000 population may appoint a county inspector of weights and measures who shall serve during the pleasure of said board, and shall receive a compensation to be determined by the board and to be paid out of the county treasury: Provided, however, That it shall not be obligatory upon the board of county commissioners of such counties containing a city or cities of the first, second, third or fourth class which are already provided with an inspector of weights and measures or city sealers to make such appointments. The board shall provide the necessary apparatus and supplies for the said inspector of weights and measures and the county councils of such counties shall appropriate such sums of money as are necessary for the maintenance of the office. The common council of every city of the first and second class shall provide for the appointment by the commissioners of public safety, commonly known as the board of public safety, of an inspector of weights and measures and provide for his compensation and for the necessary apparatus and expenses to be paid out of the city treasury. The said inspector of weights and measures shall serve continuously during good behavior under the provisions of section 160 of an act concerning municipal corporations approved March 6, 1905, governing the fire and police force, and said inspector of weights and measures shall not be removed for any political reason and only for good and sufficient cause after an opportunity for a hearing is given by the said commissioners of public safety: Provided, however, That such provisions shall not affect the power of the State Commissioner of Weights and Measures to discharge county or city inspectors of weights and measures as set forth in section 4 of this act. The compensation of such an inspector of weights and measures shall not be less than fifteen hundred ($1,500) dollars per annum nor more than eighteen hundred ($1,800) dollars per annum in the case of cities of the first class and not less than twelve hundred ($1,200) dollars per annum nor more than fifteen hundred ($1,500) dollars per annum in case of cities of the second class. The county or city inspector of weights and measures when appointed shall be a deputy inspector under the direction of the State Commissioner of Weights and Measures. He shall take charge of and safely keep the county or city standards. Where not otherwise provided by law, the county or city inspector of weights and measures shall have the power within his county or city to inspect, test, try and ascertain if they are correct, all weights, scales, beams, measures of every kind, instrument or mechanical devices for measurement and the tools, appliances or accessories, connected with any or all such instruments or measurements used or employed within the county or city by any proprietor, agent, lessee or employe in determining the size, quantity, extent or measurement of quantities, things, produce, articles for distribution or consumption offered or submitted by such person or persons for sale, for hire or award. He shall at least twice in each year and as much oftener as he may deem necessary see that the weights, measures and all apparatus used in the county or city are correct. He may for the purposes above mentioned, and in the general performances of his official duties, enter or go into or upon without formal warrant, any stand, place, building or premises or may stop any vendor, peddler, junk dealer, coal wagon, ice wagon, or any dealer whatsoever, for the purpose of making the proper tests. Whenever the county or city inspector of weights and measures find a violation of the statutes relating to weights and measures he shall cause the violator to be prosecuted. The county or city inspector of weights and measures shall keep a complete record of the work done by him and shall make a monthly and annual report to his board of county commissioners or to the mayor and an annual report, duly sworn to, not later than the first of December to the State Commissioner of Weights and Measures. The county or city inspector of weights and measures shall forthwith on his appointment give a bond with sureties to be approved by the appointing power for the faithful performance of the duties of his office and for the safety of the local standards and such appliances for verification as are committed to his charge and for the surrender thereof immediately to his successor in office or to the person appointed by the proper authority to receive them. The county inspector of weights and measures shall have jurisdiction over the whole county except as to incorporated cities which have provided for a city inspector of weights and measures under the provisions of this act. "This act shall apply to the sealers or inspectors of weights and measures heretofore appointed under any State law or city ordinance and such sealer or inspector shall be continued in office as inspector of weights and measures under the provisions of this act for the respective city or cities."

(As amended, Acts 1913, page 423.)

Eligibility of Inspectors.

Sec. 4. Only those persons shall be eligible to appointment to the position of county or city inspectors of weights and measures who at the time of the passage of this act are county or city sealers or inspectors of weights and measures or who have had recent experience in the duties and work of the office or who have passed an examination which shall be given by the State Commissioner of Weights and Measures to test the ability of the person so examined to perform satisfactorily the duties of a county or city inspector of weights and measures. If it is evident to the State Commissioner of Weights and Measures that any county or city inspector of weights and measures is not properly and faithfully performing the duties of his office, the State Commissioner of Weights and Measures shall have power to discharge such county or city inspector of weights and measures. Such removal, however, shall not be made until five days notice of the charge or charges shall have been mailed to him by said commissioner, naming a time and place for a hearing by the State Board of Health, not less than two weeks later than the time of mailing such notice to said county or city inspector of weights and measures: Provided, however, That any county or city inspector of weights and measures so removed by the State Commissioner of Weights and Measures, shall have the right to appeal from the action of said commissioner to the circuit or superior court of the county in which such county or city inspector of weights and measures reside, and during the pendency of such appeal, such county or city inspector of weights and measures may serve in his official capacity. Any county or city inspector of weights and measures discharged as herein provided, shall be ineligible to hold the position of county or city inspector of weights and measures for four years, and the vacancy shall be filled by the proper authorities, as provided in this act.

(As amended, Acts 1913, page 426.)

Testing and Sealing Scales, Weights and Measures.

Sec. 5. Whenever the inspector of the city or county or the State Commissioner or his deputies tests and compares scales, weights or measures and finds that they correspond with the standards in his possession he shall seal and mark such scales, weights or measures by stamping upon them the letters "Ind. S.," meaning Indiana Standard, and the last two figures of the year in which the same is done.

(As amended, Acts 1913, page 426.)

Police Powers.

Sec. 6. The Commissioner of Weights and Measures, his deputies and inspectors, and the county and city inspectors of weights and measures, are hereby made special policemen and are authorized and empowered to arrest without formal warrant for any violation of the statutes in relation to scales, weights and measures, and to seize for use as evidence and without formal warrant any false weight, scales, measure, or weighing or measuring device, or packages or amounts of commodities found to be used, retained or offered or exposed for sale or sold in violation of law.

(As amended, Acts 1913, page 427.)

Molestation of Inspectors—Penalty.

Sec. 7. Any person who shall molest, hinder, or obstruct in any way the Commissioner of Weights and Measures, his deputies or inspectors, or any county or city inspector of weights and measures in the performance of his official duties hereunder, shall be guilty of a misdemeanor, and be punished upon conviction thereof in any court of competent jurisdiction by a fine of not less than ten dollars nor more than two hundred dollars, to which may be added imprisonment in the county jail for not more than ninety days.

(As amended, Acts 1913, page 427.)

False Scales, Weights or Measures—Penalty.

Sec. 8. Any person, firm or corporation, who by himself, or itself, or by his, or its, servant, or as the servant or agent of another, shall use or retain in his possession any false scales, weights or measures or measuring device or any weight or measure or weighing or measuring device in the buying or selling of any commodity or thing, or who shall dispose of any condemned scales, weight, measure or weighing or measuring device contrary to law, or remove any tag, stamp or mark placed thereon by the inspector; or any person, who, by himself or by his servant or agent or as the servant or agent of another, shall sell or offer or expose for sale or who shall deliver less than the quantity he represents, or any person, firm or corporation who by himself or itself or by his or its, servant or agent, or as the servant or agent of another, shall sell, offer for sale or have in his possession for the purpose of selling, any false scales, weight or measure or any device or instrument to be used or calculated to falsify any weight or measure, shall be guilty of a misdemeanor and shall be punished by a fine of not less than ten dollars nor more than one hundred dollars, to which may be added imprisonment in the county jail for not more than three months, upon first conviction; and upon second or subsequent conviction, he shall be punished by a fine of not less than twenty dollars, nor more than five hundred dollars, to which may be added imprisonment in the county jail for not more than six months.

(As amended, Acts 1913, page 428.)

Appropriation.

Sec. 9. The sum of five thousand ($5,000) dollars is hereby appropriated annually to defray the expenses in the enforcement of this act, to be available on the taking effect of this act, one thousand ($1,000) dollars of which shall be paid annually to the State Food and Drug Commissioner for his service as State Commissioner of Weights and Measures, the remainder to be used for the salaries of the inspectors, deputies and clerks and other expenses incurred in the enforcement of this act, and such money shall be paid on warrants of the Auditor of State, approved by the State Board of Health and attested by the secretary.

(As amended, Acts 1913, page 128.)

Commodities Sold by Standard Weight.

Sec. 10. All commodities shall be sold by standard weight or measure: Provided, however, That the provisions of this section shall not apply to commodities which are usually and customarily sold by numerical count or in gross or are sold in packages prepared and put up for sale and so marked as to indicate contents, and any person, firm or corporation, who by himself, or by his servant, or as the servant, or as the servant or agent of another violates the provisions of this section shall be guilty of a misdemeanor and shall be punished upon conviction by a fine of not less than ten dollars nor more than one hundred dollars, to which may be added imprisonment in the county jail for not more than three months, upon first conviction, and upon second or subsequent conviction, he shall be punished by a fine of not less than twenty-five dollars, nor more than five hundred dollars, to which may be added improsonment in the county jail for not more than six months.

Emergency.

Sec. 11. That an emergency exists for the immediate taking effect of this act, therefore, this act shall be in force from and after its passage.

INTENTION OF THE LAW.

The primary idea of the law is the establishment of uniform standards of weights and measures throughout the State, the promotion of uniform methods of inspecting, testing and sealing, and the protection of the consumer and business interests. Under this law no fees are collected for testing and sealing of weighing and measuring apparatus except in cities where fees have been established by city ordinance.

Under the law the weights and measures official is not only an inspector or sealer in the common and usual sense but an officer whose duty it is to see that the weights and measures used in his jurisdiction are accurate, that they are correctly used, and that the laws relating to weights and measures are properly enforced.

The State Commissioner of Weights and Measures has general supervision of the weights, measures and measuring and weighing devices in use in the State. In order that there may be a uniformity in proper types of such instruments, in the following pages will be found specifications with which the weighing and measuring instruments must comply, and weights and measures officials will condemn all apparatus which does not meet with such specifications.

The weights and measures official shall always bear in mind that the prime object of all weights and measures inspections is to secure full weight and measure, and that the purchasing of commodities on a rational basis of weight, measure or numerical count forms an equitable basis of dealing for the producer, distributor and consumer. The elimination of false apparatus and the securing of correct apparatus is only the first step in the work.

The Inspector of Weights and Measures is one of the most important public officials in the community, offering a protection to the legitimate and honest dealer and to the purchasing public alike.

The Inspector shall adhere strictly to the law. He should be tactful, energetic and conscientious. The Inspector in many places must realize that he is doing missionary work, that his work is not yet fully understood, and consequently not appreciated, and that the people have not reached a state of education or enlightenment where they recognize that honest quantity is of prime importance and that the lack of supervision of weights and measures and the methods of selling is a serious monetary loss to the purchaser, and in many cases, to the dealer. By the fulfillment of his duty in the enforcement of the law, the Inspector will gain the respect of all honest merchants and will show the buying public that honest quantity is as important as honest quality.

The Inspector of Weights and Measures should have in his possession a copy of the State and local laws referring to weights and measures, and should see that all laws are strictly complied with.

EQUIPMENT AND SEALING.

Lists of apparatus and specifications for the same are published by the State Department of Weights and Measures in a separate pamphlet, which may be obtained by writing to the department. Every county should have a set of working standards, that is, standards by which the commercial apparatus can be tested. These standards must be purchased by the county and must be submitted to and verified by the State Commissioner of Weights and Measures before they can be used as standards. By law *these standards must be re-submitted once in every two years for test and verification. It is of utmost importance that an Inspector's standards be certified to agree with the State standards in order that their legality may not be questioned.*

Every Inspector of Weights and Measures shall be provided with a steel stamp, with the letters "Ind. S," and the last two figures of the year, viz.—"Ind. S. 13."

The Inspector shall also be provided with a die with the letters "CD" or the word "condemned." The hand seal press and wired lead seals are used for marking such apparatus as would be permanently injured by stamping them.

Sealing.

The Inspector shall have a receipt book of the form recommended and a receipt of inspection and test should be given when apparatus is tested. The receipts are made out in duplicate and before taking out the carbon paper the Inspector should have the owner of the store or establishment or his duly accredited representative write his name across the receipt, so that in case it becomes necessary to use it in court as evidence, it may be easily established that the receipt was given.

Every Inspector must test each scale, weight and measure within his jurisdiction at least twice each year and more often if it is deemed necessary. On all weights, and wherever possible on other instruments, the sealing should be done with a steel die in the following manner: The first time that the weights is tested and found correct, it should be stamped with the die having the letters "Ind. S." and the last two figures of the year, for example— "Ind. S. 13." When not possible to use the sealing die, the aluminum or lead seal should be attached with a wired lead seal using the hand seal press with the die giving the year. Paper seals may also be used provided they have the letters "Ind. S. 13" plainly stamped in black type not less than ⅛ inch in length.

Condemning.

In condemning a weight or instrument that can be repaired, use the condemning tag and give the required 10 day's notice in writing. If possible, *so wire the instrument that it cannot be used.* The condemning tags shall be numbered consecutively and the tag shall be filled out and the lower part retained by the Inspector as a check on the removal of the condemning tag, from the instrument. Only use the condemning tag when it is possible to have the instrument repaired and put in proper condition; if this is not possible *the instrument shall be seized at once and confiscated.*

Never seal or condemn anything that has not been thoroughly inspected and tested. Whenever a weight, scale or measure, or weighing or measuring device is sealed, or when it is condemned, it shall be done in such a manner that the purchasing public can readily see the seal or condemning tag.

Have the dealers place their scales in such a position that the purchaser can see the indications on the scale. View with suspicion any scale which is so hung that the purchaser cannot see the indications of the weighing, also view with suspicion any scale which has the weights continually kept upon it or where heavy paper is placed upon the scale pan.

Linear Measures.

Specifications. Measures of length may be graduated in yards, meters, feet or inches with customary subdivisions, provided that nothing in this section shall prevent the subdivision of the Gunter's chain into links.

Main divisions shall be plainly designated and the length of their graduations shall be longer than that of the intermediate subdivisions. Intermediate subdivisions shall be varied in length that they may be conveniently read.

Lines shall not be greater in width than ¼ of the smallest subdivision. Provided, however, that in no case shall the line be wider than .03 inch.

All graduations must be spaced uniformly and be perpendicular to the edge of measure.

Measures of length may be made of any material whose form or dimensions remain reasonably permanent under normal conditions, for example steel, brass, hard wood, etc. Provided, however, that tapes for commercial purposes may be made of wire woven cloth.

The ends of wooden measures shall be protected by metal firmly attached to the measures.

Length measures shall be smooth and straight.

No counter tacks shall be allowed.

In states where the law requires tapes to be sealed, the tension, temperature, method of support and correction should be stated by the sealer in a certificate.

Tapes which have errors exceeding those in the following table should not be sealed:

Length.	Allowable Error.	Tension.
100 feet	1/4 inch	10 pounds.
66 feet	1/4 inch	10 pounds.
50 feet	3/32 inch	10 pounds.
33 feet	3/32 inch	10 pounds.
25 feet	1/16 inch	10 pounds.
10 feet	1/16 inch	5 pounds.
6 feet	1/32 inch	5 pounds.
3 feet	1/32 inch	5 pounds.

On all measures of length except tapes the following tolerances shall be allowed:

Length.	Tolerance.
6 feet.	3/16 inch.
5 feet.	5/32 inch.
4 feet.	1/8 inch.
3 feet.	3/32 inch.
2 feet.	1/16 inch.
1 foot.	1/32 Inch.
6 inches or less.	1/64 inch.

Tapes under test are to be supported on a plane surface or the floor for their entire length.

Inspecting. Note whether the measure complies with the specification above. Sight down the measuring edge of a rigid measure and see if it is straight. Note whether the denominations are clearly indicated.

Testing. To test a linear measure (yard stick) lay it on the standard. It should come between the stops indicating one yard. When the measure is fastened to the counter lay the working standard on it. If the measure is short or long by an error greater than that indicated in the specifications, it should be condemned. If the test is made with a steel tape lay the tape on the measure and see that the divisions on the measure and the tape agree.

If a tape is to be tested it should be stretched along the standard and the individual graduation observed. Particular attention should be given to the intermediate divisions.

Sealing. Yard measures found satisfactory should be sealed by stamping with the steel stamp. Do not attempt to stamp on the steel tape—stamp the handle. If the tape itself is to be marked it should be done as follows: Spread a little paraffin on the part of the steel tape where the marking is to occur and then with a pointed instrument write on the tape through the paraffin; then place dilute nitric acid over the markings cut through the paraffin and allow it to etch for two or three minutes. Thoroughly wash and dry and remove the paraffin with a little oil.

Linear measures found faulty and not complying with the specifications and tolerances shall be condemned.

Liquid Capacity Measures.

(Not including graduated glassware.)

Specifications. Liquid measures must be made strong enough to withstand ordinary usage without becoming easily bent, indented, or damaged, and should be made of enamelware, metal, glass, or composition.

Liquid measures must be such that the capacity is determined by a definite edge at the top of the measure, and graduating rings, except those placed to strengthen the measure, will not be allowed. These re-enforcing rings must be so placed that they cannot be mistaken for graduations.

The capacity shall be legibly and permanently indicated on the side of the measure. On enamel and composition measures this marking shall be of a different color than that of the measure.

In a liquid measure having a tap, this tap must completely empty the measure without tilting and when pouring lip is provided the measure must hold its full capacity without the contents running into the lip.

The following errors are allowable:

Measure.	Tolerance.	
10 gal.	5. fl. oz.	9.0 cu. in.
5 gal.	3. fl. oz.	5.4 cu. in.
4 gal.	2. fl. oz.	3.6 cu. in.
3 gal.	2. fl. oz.	3.6 cu. in.
2 gal.	1. fl. oz.	1.8 cu. in.
1 gal.	4. fl. drams.	.9 cu. in.
½ gal.	3. fl. drams.	.68 cu. in.
1 quart.	2. fl. drams.	.45 cu. in.
1 pint.	1.5 fl. drams.	.34 cu. in.
½ pint.	1.0 fl. drams.	.22 cu. in.
1 gill.	1.0 fl. drams.	.22 cu. in.

Inspecting. Note whether the measure complies with specifications as to form, material and marking. All measures that are dented or have become filled with foreign matter or have become "caked" with the material which is being measured (for instance molasses or paint measures when "caked") should be condemned.

Testing. To test liquid capacity measures fill the working standard with water even with the top, which may be determined by using a flat glass plate called a "slicker" plate and fill the measure full, even with this glass plate. Slightly displace the "slicker" plate and pour the water from the working standard into the measure. If the measure is not large enough, namely, if it is short, some water will remain in the standard, and the amount left in the standard can be determined by pouring it into a glass graduate and thus noting the ounces and drams or cubic inches that the measure is short.

If on the other hand the measure under test is too large, it will be necessary to add water in excess of that contained in the working standard. This excess may also be determined by the use of the glass graduate.

Large measures such as milk cans, oil cans, etc., may be tested by weighing them empty, clean and dry and then filling them with water to the place where they are usually filled and again weighing. The difference of the two weighings is the weight of the water contained. This divided by 8.323 lbs., which is the weight of a gallon of water, gives the number of gallons contained. For example: Suppose a five-gallon oil can weighs three pounds and when filled with water to the bottom of the neck weighs 44¾ lbs.

Then $44\frac{3}{4}-3=41\frac{3}{4}$; and $41\frac{3}{4}\div 8.323=5$.

Sealing. Measures which are found to be correct should be sealed.

In marking metal measures they may be stamped with a steel stamp, making a good impression with the die. They should be stamped near the top on the side of the measure, on the lip or on the handle.

Glazed measures may be sealed by tagging with a wired lead seal on the handle.

Glass measures should be marked with etching ink or a rubber stamp, leaving a permanent mark.

Measures which do not conform to the specifications and do not show the proper capacity on test should be condemned.

MILK BOTTLES.

Specifications. A bottle used for the sale of milk and cream must contain the amount for which it is sold.

Testing. Test milk bottles in the same manner as liquid capacity measures, the bottle being filled up to the bottom of the cap ring or stopple.

The following variations on individual bottles or jars are allowable, but the average capacity of not less than 25 bottles taken at random from at least four times the number tested must not be in error by more than one-quarter of the tolerances.

Size of Bottle or Jar.	Maximum. Above.	Maximum. Below.
½ gallon	6 drams.	6 drams.
3 pint	5 drams.	5 drams.
1 quart	4 drams.	4 drams.
1 pint	3 drams.	3 drams.
½ pint	2 drams.	2 drams.
1 gill	2 drams.	2 drams.

MEASURING PUMPS.

Specifications. All stops, where there are such, should be so arranged that they can be sealed in such a manner that the stops cannot be changed without destroying the seal.

The amounts delivered shall be correct within the tolerances specified for liquid measures.

The amounts delivered shall be correct irrespective of the speed with which it may be operated or whether it has been unused for any length of time.

Inspection. A measuring pump is simply a liquid measure with some form of elevating or discharging device. All stops, nuts and screws should be securely fastened. No gears or racks should be broken. Stops which do not form an integral part of the frame should be so arranged that they can be sealed individually.

Testing. Test a liquid gallon, a half gallon and a quart measure in use in the store with the standards, and having found them correct seal them. Then pump some of the liquid into the sealed measures by turning the handle of the pump to the indicated values. The amount of liquid, whether molasses, heavy oil, kerosene or gasoline should fill the sealed measures even full. Repeat this at least four times with each measure, using various speeds of turning the handle. If the sealed measure overflows, the stops are not set correctly; if it is not filled the stops are not set correctly or the valves leak.

Sealing. Measuring pumps, when correct, must be sealed by a special lock nut or by a wired lead seal, near the top of the frame work. Also seal all adjustable stops. Measuring pumps that do not comply with the above specifications should be condemned.

Dry Capacity Measures.

Specifications. Dry capacity measures must be made of metal, well dried wood or composition and must be strong enough to stand the use to which they are subjected without materially changing their shape or becoming indented.

All dry measures up to and including ½ bushel shall be cylindrical and circular in cross-section. Provided, however, that measures may be used if the diameter of the top is not more than 10 per cent. greater than that of the bottom diameter. In no case must the top diameter be less than that of the bottom.

The bottoms must be flat and perpendicular to the axis of the measure. Provided, however, that for strengthening purposes the bottoms of metal measures may be slightly corrugated. These corrugations may be straight or radial but not concentric.

Wooden measures above one pint shall have a metal band around the top.

Measures of one bushel and over must be equipped with handles.

Baskets used as measures shall not be less than ½ bushel capacity.

The capacity of the measure shall be defined by the top rim.

CAPACITY.	DIMENSIONS IN INCHES.		TOLERANCES.		
	Diameter.	Depth.	Diameter.	Depth.	Cubic Inches
Half bushel	13 39-40	7 1-24	3-16	3-16	15
One peck	11	5 5-8	1-8	1-8	8
Half peck	8 1-2	4 3-4	1-8	1-8	5
Quarter peck	6 5-8	3 7-8	1-8	1-8	2.5
One quart	5 5-16	3	1-16	1-16	1.5
One pint	4 1-2	2 9-25	1-16	1-16	1.5

Containers which are not of the capacity of a bushel, its multiples, or its binary subdivisions shall not be used as measures.

The capacity shall be plainly marked on the side and shall be preceded by the word "Dry" in the case of the quart, pint and half pint. The letters shall be at least ½ inch high and ¼ inch wide.

Double capacity measures or measures with one end used for one capacity and the other for a different capacity shall not be used.

Dry capacity measures used for measuring commodities where heaped measure is required shall have minimum diameters and corresponding depths, with allowable variations as given in the following table:

The following errors are allowable:

Measure.	Tolerance.
1 bushel	25. cu. in.
½ bushel.	15. cu. in.
1 peck.	8. cu. in.
½ peck.	5. cu. in.
2 quarts.	2.5 cu. in.
1 quart.	1.5 cu. in.
1 pint.	1.0 cu. in.
½ pint.	.5 cu. in.
¼ pint.	.25 cu. in.

If full variation is allowed on one dimension, the other dimension shall be correct.

Half bushel baskets or boxes, heaping measure, shall contain ⅝ bushel, stricken measure.

One bushel baskets or boxes, heaping measure, shall contain 1¼ bushels, stricken measure.

The denomination of the measures shall be marked on the side in letters at least half an inch high and wide.

Dry measures made of metal may be stamped on the bottom. Dry struck measures must be of the following interior capacities respectively:

STRICKEN DRY CAPACITY MEASURES.

	Capacity in Cubic Inches.	Tolerance in Cubic Inches.
1 bushel	2,150.42	25
½ bushel	1,075.21	15
1 peck	537.60	8
½ peck	268.80	5
2 quarts	134.40	2.5
1 quart	67.2	1.5

The following dry measures are condemned by the State Department of Weights and Measures:

1. Bottomless measure.
2. Removable bottom measure.
3. Adjustable bottom measure.
4. Double measure.
5. Flaring measure.

Only measures which comply with the specifications for dry measures are permitted to be used. See table——page——.

Sealing. The measure shall be marked in a conspicuous place, namely on the side. If of wood, seal across the lapped part of the measure. Use a stencil plate, and mark the measure with letters three-quarters of an inch in height with the initial or initials of "Ind. S" and the last two figures of the year. Metal measures and composition measures shall be stamped with either the steel die or the sealing clamp.

BERRY BOXES.

Specifications. Boxes for the sale of small fruit shall be not less than a quart, pint or half pint dry measure.

No variation under above capacities is legally permitted. The following variation of 3 per cent. in excess is allowable.

Capacity.	Maximum. Tolerance.
1 quart	2.0 cu. in.
1 pint	1.0 cu. in.
½ pint	0.5 cu. in.

To find the capacity of the ordinary berry box with sloping sides by measurement, add together the area of the top and bottom, multiply by the depth and divide by 2. Example: a berry box is 5.1 inches square on top, 4.3 inches square on the bottom and 3 inches in depth: Then $(5.1\times5.1)\times(4.3\times4.3)\times3\div2=$ 66.7 cubic inches.

Inspecting. A berry box shall be carefully inspected to see whether the bottom is raised or a false bottom inserted or sides pressed in.

Testing. A berry box is tested by taking a stricken quart, pint or ½ pint of beans and pouring them into the berry box, which should be then stricken full. Any excess shall be poured into a cubic inch graduate and the number of inches noted. If the shortage is greater that the allowable variation, the user of the box shall be prosecuted under Section 8, Chapter 161, Acts 1913.

Sealing. Berry boxes need not be stamped, marked or sealed.

All berry boxes found short of the legal requirements shall be seized and turned over to the proper officials.

KINDS OF FAULTY BERRY BOXES LIKELY TO BE ENCOUNTERED.

1. Berry boxes made of two over-lapping strips of wood, the inner one being pressed up so as to raise the bottom.
2. Small half-pint boxes, some of wood and some of metal.
3. Berry boxes with inserted bottom placed too high.
4. Berry boxes with sides drawn in at the bottom.
5. Berry boxes ordered as "snide," "shallow snide," "short snide" and "North Carolina quarts."

BOXES AND CRATES.

These boxes or crates are used stricken full to carry the commodity to market. A box or crate 12 by 14 by 16 inches equals 2,688 cubic inches, stricken full will hold a heaping bushel. The error in dimension on one side should not vary over ⅛ inch.

Measures that do not comply with these specifications shall be condemned.

Inspecting.—Note whether the measure complies with the specifications as to form and marking.

Pay particular attention to the appearance of the measure, that is, see whether it has been relapped or a false bottom inserted.

If it is of metal, see that it is not indented, or the bottom bent up.

See that the measure complies with the dimensions given in the above tables.

Bottomless measures shall be condemned.

If liquid measures are used for selling dry commodities, they shall be condemned.

Testing.—Cylindrical dry measures may be tested by measuring the depth and diameter with a rule or dry measure gauge. Measure the depth and diameter in various places and see that there is no considerable variation in either. If the measure shows the correct capacity, it should be stamped, if not, it should be condemned.

If the measure is short and there is sufficient evidence to prosecute, test such dry measure by comparison with the standard, using grain, before swearing out a warrant.

A bushel crate for apples, pears, plums, peaches, and other fruits not secondarily contained in quart or other boxes within such crate, shall have an interior capacity of one bushel, heaped measure, which is construed to be 40 quarts. The same is applicable to fruits, vegetables, and other dry commodities customarily sold by heaped measure. But in all cases where the weight per bushel or fractional part thereof is established by law, the full net weight shall be required.

These measures are the standard measures for fruits, vegetables, and other dry commodities customarily sold by heaped measure, the purpose being that such heaped measures shall contain the respective weights established in Section 697, Chapter 169 of the Acts of 1905.

The avoirdupois weight of a bushel of certain commodities as specified in Section 697, Chapter 169, Acts of 1905.

ARTICLES.	POUNDS PER										
	Bushel.	Half Bushel.		Peck.		Half Peck.		Quarter Peck.		Quart.	
	Lbs.	Lbs.	Ozs.	Lbs.	Ozs.	Lbs.	Ozs.	Lbs.	Ozs.	Lbs.	Ozs.
Apples, dried	25	12	8	6	4	3	2	1	9	..	12½
Barley	48	24	..	12	..	6	..	3	..	1	8
Beans	60	30	..	15	..	7	8	3	12	1	14
Beans, castor	46	23	..	11	8	5	12	2	14	1	7
Buckwheat	50	25	..	12	8	6	4	3	2	1	9
Coal, mineral	80	..	..	..	..	.	..	..	..	..	..
Corn meal	50	25	..	12	8	6	4	3	2	1	9
Corn, pop	56	28	.	14	..	7	..	3	8	1	12
Corn (in ear until December 1)	70	35	..	17	8	8	12	4	6	2	3
Corn (in ear after December 1)	68	34	..	17	..	8	8	4	4	2	2
Corn, shelled	56	28	..	14	...	7	..	3	8	1	12
Cranberries	33	16	8	8	4	4	2	2	1	1	1
Malt rye	35	17	8	8	12	4	6	2	3	1	1½
Middlings, fine	40	20	..	10	..	5	..	2	8	1	4
Middlings, coarse	30	15	..	7	8	3	12	1	14	..	15
Oats	32	16	..	8	..	4	..	2	.	1	..
Onions	48	24	..	12	..	6	..	3	..	1	8
Osage orange	33	16	8	8	4	4	2	2	1	1	½
Parsnips	55	27	8	13	12	6	14	3	7	1	11½
Peaches, dried	33	16	8	8	4	4	2	2	1	1	½
Potatoes	60	30	..	15	..	7	8	3	12	1	14
Potatoes, sweet	55	27	8	13	12	6	14	3	7	1	11½
Rye	56	28	..	14	..	7	..	3	8	1	12
Salt	50	25	..	12	8	6	4	3	2	1	9
Seed, blue grass	14	7	..	3	8	1	12	..	14	.	7
Seed, clover	60	30	..	15	..	7	8	3	12	1	14

Seed, hemp	44	22	..	11	..	5	8	2	12	1	6
Seed, millet	50	25	..	12	8	6	4	3	2	1	9
Seed, orchard	14	7	..	3	8	1	12	..	14	..	7
Seed, timothy	45	22	8	11	4	5	10	2	13	1	6½
Turnips	55	27	8	13	12	6	14	3	7	1	11½
Wheat	60	30	..	15	..	7	8	3	12	1	14

A barrel of flour weighs 196 lbs.; one-half barrel, 98 lbs.; one-fourth barrel, 49 lbs.; one-eighth barrel, 24½ lbs.
Sorghum molasses weighs 11 pounds to the gallon.
Hay or straw 2,000 pounds to the ton.

SCALES.

General Specifications.

Where the scale is not equipped with a full capacity beam or reading face, which together with beam and runner indicates the capacity, the maximum capacity must be clearly and permanently placed on the scale where it can be easily seen.

The construction of all scales must be such that they will bear the maximum capacity without perceptibly bending, straining or loosening the parts.

All knife-edges must be firmly attached.

The knife edges must be of hardened and tempered steel. They must be sharp throughout their entire length of bearing contact and bear evenly the length of their working parts.

Bearing covers which are liable to come in contact with the knife edges must be smooth and of a material equal in hardness to the knife edge. The part of the knife edge coming in such contact must be so constructed that the friction due to this cause is reduced to a minimum.

If the scale has interchangeable or reversible parts, the interchange or reversal must not affect the accuracy of the instrument.

The position of all nose irons shall be clearly indicated by a well defined mark showing the position of these parts when the scale was installed.

Scales equipped with a scoop counterbalanced by a removable poise or weight must not be used.

The graduations on all beams shall consist of sharply defined lines or notches which must be uniform in spacing and character and parallel to each other.

Weight graduations on the beam must indicate the weight represented by the poise.

A shoulder stop must be provided on all beams to prevent the poise traveling back of the zero graduation.

The adjusting material in all poises must be securely enclosed and permanently attached, and in such a position that it will not rub on the beam.

Where the poise is equipped with a set screw this must be permanently attached and not removable.

Where the poise is provided with a device intended to engage in the notches this must fit firmly and without perceptible movement.

The bearing edge of hanging poises must be hard and sharp.

Poises must not be readily detachable from the beam.

The normal position of the beam shall be horizontal.

Unstable or accelerating scales shall not be used.

The term "bearing" herein referred to is defined as the entire contact between the knife-edge and bearing surface.

The sensibility-reciprocal is the weight required to move the beam, pan, pointer or other indicating device of a scale a definite amount. In scales provided with a beam and trig loop the sensibility reciprocal is the added weight required to be placed on the platform to break and turn the beam from a horizontal position in the middle of the loop to a position of equilibrium at the top of the loop. This may be determined indirectly by subtracting the weight instead of adding it; or by using the sliding poise on the beam if this is moved without jarring the beam.

In the case of scales with stabilized platforms such as even arm trip scales and single platform scales such as postal scales, the sensibility-reciprocal is the amount of added weight required on the platform to cause the pan to move from the normal position to a position of equilibrium at the limit of its motion. In scales provided with a pointer and graduated arc, it is the weight required to move the pointer over one division.

PLATFORM SCALES.

Specifications. The foundation of all built-in scales shall be solid and firm.

All bearings shall be smooth and of a material at least equal in hardness to the knife-edges. For scales of above 5,000 lbs. capacity the bearings shall be made of steel tempered **Hard.** The term "bearing" used in this paragraph refers to the entire line of contact between knife edges and their bearings and the point of contact between nose ironsteels and shackle bars.

Platform scales having an outside frame must be equipped with a checking or centering device which will keep the platform from binding against the frame and hold the platform bearings in their proper position on the main lever knife edges. These devices must not bind and must also cause the platform bearings to return to their normal line of contact on the knife-edges when the platform is disturbed.

Scales with platforms must be so constructed that there is sufficient clearance between the platform and the frame to allow for any expansion due to weather effects. Sufficient clearance must also be provided that the live parts of the scale will not bind or be interfered with by the ordinary accumulation of dirt.

A wagon scale should have at least 12 feet of straight way on either side of the scale in the same plane as the platform.

Platforms and levers must be made sufficiently rigid that the degree of deflection under the maximum load will not affect the accuracy of the scale. When the scale is equipped with a relieving device its operation must not change the normal balance of the beam.

When corner platform loops are removable they must be marked to identify them with their proper corner.

The balance ball on all counter platform scales shall be so constructed that it can be operated only by a mechanical device.

Any device for altering the sensibility of the scale or which might cause the beam to become unstable or accelerating shall be so limited in adjustment that the beam cannot be made unstable.

All beams shall be so marked and graduated that the value of the weight can be directly read on the beam at all points whether or not a registering or stamping device is used.

The beam shall have equal play above and below the normal horizontal position.

The minimum travel of the beam in the trig-loop shall conform to the following table:

Length of Beam.	
Under 12 inches	.4 inch
Over 12 inches and including 20 inches	.5 inch.
Over 20 inches and including 40 inches	.7 inch.
Over 40 inches and up	.9 inch.

The length of the beam refers to the distance from the fulcrum to the nearest point of the trig-loop.

If the poise on a notched beam is equipped with a spring this shall be of sufficient strength to seat the pawl in its proper position wherever in the notch the pawl is placed.

Poises shall be so constructed that no part can be easily detached.

Reading edges or indicators of poises must be sharply defined and all reading edges must be parallel to the graduations.

The sensibility reciprocal of platform scales shall not exceed the value of two of the minimum graduations on the beam at the capacity or at any lesser load.

The tolerance allowed at any load must not exceed that in the following table, provided, however, that the tolerance in no case shall be less than the minimum graduation on the beam.

"Inside scales" are defined as scales that are used inside of a building.

"Outside scales" are defined as scales of the dormant, wagon and railroad track type which are installed outside of a building.

The columns with the heading "On Ratio" refers to the error in the ratio or multiplication of scales with which counterpoise weights are used.

The columns with the heading "Full Capacity Beam" refers to weightless or self-contained scales.

The column with the heading "Load" refers to the amount of weight placed in any position on the scale platform.

LOAD.	INSIDE SCALES.		OUTSIDE SCALES.	
	On Ratio.	Full Capacity Beam.	On Ratio.	Full Capacity Beam.
50 pounds	½ oz.	1 oz.	....	....
100 pounds	1 oz.	2 oz.	....	....
200 pounds	2 oz.	4 oz.	....	....
240 pounds	3 oz.	6 oz.	....	....
300 pounds	3 oz.	6 oz.	....	....
400 pounds	4 oz.	8 oz.	....	....
600 pounds	6 oz.	12 oz.	....	....
800 pounds	8 oz.	1 lb.	....	....
1000 pounds	8 oz.	1 lb.	....	....
1200 pounds	10 oz.	1¼ lb.	....	....
1500 pounds	12 oz.	1½ lb.	....	....
1800 pounds	14 oz.	1¾ lb.	....	....
1 ton	1 lb.	2 lb.	2 lb.	4 lb.
1½ tons	1¼ lb.	2½ lb.	2½ lb.	5 lb.
2 tons	2 lb.	4 lb.	4 lb.	8 lb.
3 tons	3 lb.	6 lb.	6 lb.	12 lb.
4 tons	4 lb.	8 lb.	8 lb.	16 lb.
5 tons	5 lb.	10 lb.	10 lb.	20 lb.
6 tons	6 lb.	12 lb.	12 lb.	24 lb.
8 tons	8 lb.	16 lb.	16 lb.	32 lb.
10 tons	10 lb.	20 lb.	20 lb.	40 lb.
12 tons	12 lb.	24 lb.	24 lb.	48 lb.
15 tons	15 lb.	30 lb.	30 lb.	60 lb.
20 tons	20 lb.	40 lb.	40 lb.	80 lb.
40 tons	40 lb.	80 lb.	80 lb.	160 lb.
50 tons	50 lb.	100 lb.	100 lb.	200 lb.
80 tons	80 lb.	160 lb.	160 lb.	320 lb.
100 tons	100 lb.	200 lb.	200 lb.	400 lb.
150 tons	150 lb.	300 lb.	300 lb.	600 lb.
200 tons	200 lb.	400 lb.	400 lb.	800 lb.

Inspection.—Note condition of platform. It should not touch the frame at any point. There should be no stones, pieces of coal or foreign bodies wedged between the platform and frame. It should move freely. Note if the beam is worn. The balance ball, if there is one, should be in such a position that it can still be moved to one side or the other. Note the condition of the sliding poise and the counterpoise weights; they should be in first-class condition. The sliding poise should not be bent or dented, particularly at the edge on which readings on the beam are taken. Look underneath the scale and see that all the check rods are in place and that they are neither too tight nor too loose. The bearings should not be corroded or rusted, but should be clean and hard.

Particular attention must be given to a wagon scale that is not covered and to one that is in such a position that most of the vehicles passing the place pass over the scale.

Testing.—The following steps should be taken:

1. With platform clear and clean, counterpoise weights removed, and sliding poise at the zero indications on the beam, bring the beam to a balance with the balance ball or lead in the shot cup.

2. Test for sensitiveness and accuracy and for variations on different parts of the platform. (See specifications for tables.)

3. Place a one-pound standard on the counterpoise, or hang a standard one-pound hanger weight in the counterpoise loop, or on the counter-poise, and place weights on the platform until a balance is established. The ratio of one pound to the weight on the platform then gives the multiplying power of the scale. (This should be indicated on the counterpoise weights.)

4. Having determined the multiplying power, the counterpoise weights can be tested to see if this same ratio is borne out. It is extremely important to test the counterpoise weights as accurately as possible as any error in them is multiplied many times for a commodity weighed on the platform.

5. Place 50 pounds on the center of the platform and see if when the sliding weight indicates 50 pounds the beam balances; viz., vibrates between the same two positions as with no load (250 pounds and up on larger scales.)

6. Place weights on the platform and test the marked divisions of the beam or beams.

When testing, the beam should not vibrate too slowly, but should vibrate rather rapidly on either side of the point of rest.

7. If the scale is of the capacity of one ton or over, place a ton of weight on the platform and see if the beam and counterpoises give correct results.

8. It is best to test a scale to its full capacity, as various defects, such as faulty foundation, binding of parts, etc., may develop, if the scale is of the

capacity of a ton or over. To this end, it is well to place a loaded wagon on the scale, cause a balance of the beam by means of counterpoise and sliding poise, and then add 500 pounds of test weights on the platform and note if the beam indicates this increase correctly. Repeat this with various increasing loads, depending on the capacity of the scale.

9. In drop lever balances or scales, the drop lever should be raised and lowered several times with a heavy load on the platform, scoop or pan and note taken whether the indications are uniform.

10. A scale in adjustment shall fulfill all of the above tests.

Note.—The adjustment is here purposely omitted as it is the function of the sealer to test the correctness of the same and not adjust the levers or parts of the scale.

Sealing.—If the scale is correct, seal the counterpoise weights by stamping with steel stamp. In a conspicuous place on a non-movable part of the scale frame affix a gummed seal. If a plug or shield for sealing is provided, stamp it with the sealing die. If the scale is not correct or does not comply with the specifications, condemn it. Tack a card with sealer's address in the beam box of wagon scales.

Note.—All scales which are provided with a balance ball or balancing devices used for the purpose of balancing scales, which can be adjusted without the use of an outside mechanical device, are condemned.

KINDS OF FAULTY PLATFORM SCALES LIKELY TO BE ENCOUNTERED.

1. Scale does not balance when platform is empty and poise on zero.
2. Scale weighs incorrectly for weights on platform.
3. Check rods too loose or too tight.
4. Counterpoise weights wrong.
5. Sliding poise wrong due to weight or wearing of the same at index.
6. Platform binds on the frame.
7. Scale does not weigh alike on different parts of the platform.
8. Balance ball will not balance scale when empty.
9. Dirt on scale or in pit; viz., straw, mud, etc., on any of the movable parts of the scale inside or outside.
10. Bearings broken.
11. Scale too sluggish.
12. Bearings dull.

13. Bending of parts of scale or levers; or giving of foundation when full load is placed on platform.

14. Beam worn, or unevenly notched or divided.

15. Scale insufficiently sensitive.

16. Foundation or parts of scale of insufficient strength to support maximum load.

Automatic Machines.

The term "automatic weighing machine" means a machine in which special self-acting machinery is introduced to effect an automatic feed, the rapid weighing of given loads, the registration and summation of loads, and other similar purposes, or some of them.

Counter Balances and Scales.

Specifications. Bearings must be made of a material equal at least to the knife-edges in hardness. (Tempered steel or agate may be used but are not required.)

The shape of the bearings must be such that when the beam is displaced in any manner, the knife-edges will return to their proper line of contact.

The under connections must form a parallelogram with a line joining the knife-edges in the beam. These connections must be straight and work freely.

All material used for balancing the scale must be securely enclosed.

Attachments for adjusting the balance of the scale must be of such character that they can only be operated by the use of an outside mechanical device.

Scales on which any weight or weights when used, are not visible must be equipped with a device which will plainly indicate on the customers side of the scale when the weight or weights have been added and their value.

Pendulum scales must be equipped with a device for indicating when the scale is level.

Pendulum scales must be equipped with leveling devices which require the use of an outside mechanical device for their operation.

When a weight equal to one-half the capacity of the scale is placed upon the weight plate in such a position that the edge of the weight coincides with the edge of the plate the allowable error in the scale should not exceed the allowable error for the scale at its full capacity.

When a weight equal to one-half the capacity of the scale is shifted on the commodity plate or scoop to a point one-half the distance between the center and edge of the plate or scoop the error should not exceed the allowable error for the scale at its full capacity.

When scales are equipped with a graduated beam the sensibility reciprocal allowed shall not be greater than two of the smallest graduations on the beam. Provided however, that in no case shall the sensibility reciprocal allowed be greater than that in the table below.

The minimum fall or drop of the plate or scoop on equal armed scales from its highest point shall be as follows:

Capacity 4 lbs. and below.......	.35 inch.
Capacity 4 lbs. to 12 lbs.........	.5 inch.
Capacity 12 lbs. to 26 lbs........	.75 inch.
Capacity 26 lbs. and upwards....	1. inch.

On scales equipped with graduated beams the error allowed at any point on the beam shall not exceed the same proportional part of the error allowed at the capacity of the scale that the weight represented by the poise at that point on the beam bears to the capacity of the scale. Provided, however, that the tolerance shall in no case be less than one-fourth of the sensibility reciprocal of the scale.

Except on special tests mentioned above the tolerances and sensibility reciprocal must not exceed those given in the tables below:

Capacity, Pounds.	Tolerance, Ounces.	Sensibility Reciprocal, Ounces.
1	1/16	1/8
2	1/16	1/8
4	1/8	1/4
5	1/8	1/4
6	1/8	1/4
8	1/4	1/2
10	1/4	1/2
12	1/4	1/2
15	5/16	3/4
20	5/16	3/4
24	3/8	1
25	3/8	1
30	3/8	1
40	7/16	1 1/4
50	1/2	1 1/2
60	1/2	1 1/2
75	5/8	2
90	7/8	2 1/2
100	1	3

Sensitiveness means that there must be a perceptible or appreciable movement when the above additional weights are placed on the fully loaded pan or scoop.

EQUAL ARM BALANCES.

Inspecting. See that the above specifications are compiled with. See that the balance is free and clear.

Testing. The beam with no load should be in equilibrium and when displaced should quickly return to the same position of equilibrium.

Place a load on one pan and an equal load on the other, each load being equal to about one-half the capacity of the balance. Then transpose the weights. Eqilibrium should exist. It is very important that this test be made as a scale may be in equilibrium or balance perfectly with no load on the pans and yet due to unequal length of arms, or the wrong position of the lower central stud be greatly in error when commodities are weighed thereon. *Shift the load on one pan to different parts of the pan, but not overhanging the edge of the pan. Equilibrium should still be maintained.*

If the balance has a graduated side beam, place weights on the scoop or commodity pan and test if the poise will produce a balance when placed in the indicated position. Thus, when 1 lb. is placed on the scoop there should be a balance with the poise indicating 1 lb. on the side beam.

Test the side beam for at least four values.

If the balance nuts or balls are not securely attached or allow a greater variation than noted in the specifications, condemn the instrument.

For sensitiveness and maximum variations, see foregoing table. If the balance does not comply with the prescribed sensitiveness or the error is greater than the maximum allowed, it shall be condemned.

Balances with a separate scoop and separate counterweight shall be condemned.

Four essential tests that have to be made on every even arm scale are these:

1. With no load on either side and the poise at zero the scale should balance.
2. With two equal weights, one on either side, the scale should balance, however the weights are shifted.
3. If a side beam is attached it should give the correct weight when test weights are placed on the commodity side of the scale.
4. With full load the scale should be sufficiently sensitive to clearly and definitely indicate an additional weight equal to the maximum allowable variation.

Sealing. If the balance is found to fulfill the above specifications, it should be sealed by attaching a gummed label seal in a conspicuous place, on some nonmovable part of the balance, or attaching a wired lead seal.

If the makers have provided a plug, tag or shield for sealing, mark the same with the sealing die. Balances found not to comply with the specifications or not coming up to the test shall be condemned.

FAULTY EQUAL ARM SCALES OR BALANCES LIKELY TO BE ENCOUNTERED.

(Faults are in addition to those of possible falsity of the weights.)

1. Scale out of balance, heavy on the scoop side the plea being that down weight is given.
2. Scales balance with no load but not when equal weights are placed on both pans.
3. Scale balances when equal weights are placed in center of each pan but not when one of the weights is shifted forward or backward or to the right or left.
4. Scale is insensitive due to worn or broken parts or poor construction.
5. Scale may be placed in an inclined position.
6. An outside obstruction, paper bag, box, etc., may be rubbing against one of the pans.
7. A rubber band may be placed around the beam and base.
8. A small spring or elastic may be placed under one side.
9. Metal articles, such as lead, iron rings, hooks, etc., or potatoes or other articles may be placed under the scoop or on the cross under the scoop.
10. Folded paperbags are put under scoop side or heavy paper in the scoop. This is clearly false.
11. Nested weights may be stacked to give the 8 oz., 4 oz., and 2 oz., giving 14 oz., instead of 16 oz.
12. The poise may be light, thus registering more than is really on the scoop.
13. Equal arm scales with a separate scoop and a loose counter-weight or ring, the omission of which will cause a serious error.

UNEQUAL ARM BALANCES.

This includes single and double beam scales, counter beam scales.

Inspecting. Note if specifications are complied with.

If a divided scale or tongue is used, the graduations should be clearly marked and when notched the notches well cut.

There should be no loose or broken parts.

Testing. When no load is placed on the pan, scoop or platform, the tongue or pointer should indicate equilibrium.

Place weights on the pan, scoop or platform equal to one-half the capacity of the balance and note if the weight is correctly indicated.

Place on the platform, scoop or pan the minimum weight which the balance is intended to weigh and note whether the weight of such load is properly, clearly and decidedly indicated.

Try the above operations with three intermediate loads up to half the capacity of the scale, shifting to different parts of the platform, scoop or pan. The indications in all cases should be correct.

Test the sensitiveness and error at full load; it should comply with the specifications.

Particular attention should be paid to the adjustment of the counter poise weights, which should be carefully tested (see testing of weights).

Separate scoops with equivalent poise are not allowed.

Sealing. If the balance is correct, it shall be sealed with a gummed label seal in a conspicuous place and on a non-movable part of the scale.

If not correct according to the above tests and specifications, it shall be condemned.

FAULTY UNEQUAL ARM COUNTER BALANCES LIKELY TO BE ENCOUNTERED.

1. Scales not in balance when poises are all on zero and pan is empty.
2. Scales which balance without scoop or pan, this being used however when commodity is weighed.
3. Elastic bands attached around beam and framework assisting or dampering action of beam itself.
4. Scales having objects (wood, old iron, paper, etc.) attached to beam which are weighed with each parcel of commodity sold.
5. Counterpoise hanger, counterpoise weights, weights or sliding poise lighter or heavier than correct value.
6. Scales having beams graduated irregularly.
7. Scales having poise or beam worn so that when poise is placed back as far as possible it will not be on zero mark of beam.
8. Scales having easily accessible adjusting screws by which balance may be easily and quickly changed.

9. Does not weigh properly on all parts of pan.

10. Has separate scoop and counterweight, the omission of which latter may cause a serious error.

11. Great friction in bearings or moveable parts.

SPRING BALANCES.

(Note.—The following specifications and tolerances are to apply to all spring balances except in so far as they are modified for special types, under the subheads given hereafter.)

Specifications. Graduated faces must be permanently fixed in position.

All graduations must be clear and distinct and equally spaced.

The clear interval between the graduations must be not less than .04 inch.

The pointer must be firmly attached and reach to the graduated divisions. That part of the pointer which reaches to the smallest sub-divisions must not exceed the width of these divisions.

The distance from the pointer to the reading face must not exceed .12 inch.

All devices for adjusting must be such that they are accessible or operative only by the use of an outside mechanical device.

No device to alter the working length of the spring shall be placed on the outside of the balance.

When there is no load the indicator shall clearly point to the zero graduation and there shall be no stop to prevent the indicator going beyond the zero graduation.

When the graduations commence at a fixed load the position of the pointer when there is no load shall be clearly indicated by a zero graduation.

Hanging spring scales shall be freely suspended from the ring, when in use.

If provided with a hanging pan this shall be hung to a ring and no hook will be allowed. Provided however, that a hook may be used if no pan is provided.

Where a dish shaped pan is provided there shall be an opening in said pan to allow for drainage.

When a weight equal to one-half the capacity of the scale is shifted to a point one-half the distance between the center and edge of the plate or scoop the error should not exceed the allowable error for the scale at its full capacity.

Spring balances on which a weight or weights when used are not visible must be equipped with a device which will indicate on the customers' side when the weight or weights have been added and their value.

The value of the graduations on spring balances used in the sale of foodstuffs at retail shall not be more than 1 ounce. Provided, however, that this shall not apply to scales used exclusively in the sale of vegetables.

Spring balances must give correct results whether the load is increased or decreased.

The specifications for each part of combination spring and lever balances shall be the same as those for the class to which such part belongs.

With the exception of the special test noted above spring balances must be correct within the following tolerances. Provided, however, that in no case shall the tolerance be less than one-fourth of the minimum graduation on the reading face.

This table specifies the tolerance to be allowed at the values indicated and does not refer to the capacity of the balance.

Graduations, Pounds.	Tolerances, Ounces.
1	⅛ ounce.
2	¼ ounce.
3	¼ ounce.
4	½ ounce.
5	½ ounce.
6	½ ounce.
7	½ ounce.
8	¾ ounce.
10	¾ ounce.
12	1 ounce.
15	1 ounce.
20	1½ ounce.
24	1½ ounce.
25	1½ ounce.
30	2 ounces.
40	2 ounces.
50	3 ounces.
60	3 ounces.
75	4 ounces.
90	4 ounces.
120	4 ounces.
150	6 ounces.
200	8 ounces.
300	12 ounces.
400	1 pound.
500	1¼ pound.
600	1½ pound.

STRAIGHT-FACE SPRING BALANCES.

Specifications. The support for the spring must be of sufficient strength and rigidity to sustain the maximum load without perceptible strain and it must be permanently fixed.

The graduated face must be firmly riveted to the frame at not less than three points.

The indicator must be pointed in order to facilitate accurate readings and it must not obscure the figures showing the value of the graduations.

The value and spacing of the graduations shall satisfy the requirements of the following table:

Capacity.	Maximum value of interval.	Minimum distance. between graduations.
25 pounds.	½ pound.	.03 inch.
50 pounds.	1 pound.	.03 inch.
100 pounds.	1 pound.	.03 inch.
200 pounds.	2 pounds.	.03 inch
300 pounds.	5 pounds.	.09 inch.
400 pounds.	5 pounds.	.04 inch.
500 pounds.	5 pounds.	.04 inch.

The tolerance to be allowed shall be four times that given in the preceding table for spring balances.

Inspection. See that the adjusting mechanism is suitably secured or protected so that it cannot be readily tampered with.

Testing. The accuracy of the output of the machine should be verified by reweighing, over another weighing instrument, not less than 20 continuous loads; or, where practicable, the machine may be tested directly by the application of standard weights.

In testing "totalizing" machines, not less than 40 loads should be passed over the machine, i. e., 10 minimum loads, 10 maximum loads, and 20 loads of the mean between the minimum and maximum.

Sealing. If correct, stamp with the steel die or place gummed seal upon nonmovable part of instrument.

The following variations are allowable:

Use.	Capacity.	Error.
Weighing small loads of tea, coffee, etc.	1 oz., and upwards...	½ per cent. of load, in excess only.
Weighing grain, etc. ..	10 lbs., and upwards.	¼ per cent. of the load, in excess or deficiency.
Weighing coal, etc.....	100 lbs., and upwards.	½ per cent. of the load in excess or deficiency.
"Totalizing" machines used for weighing coal, etc.	10 cwt., upwards.....	½ per cent. of the total load of 40 weighings, in excess or deficiency.

Inspecting. In spring scales, dial or drum type, the pointer shall clearly point to zero when there is no load on the instrument. By turning the head to one side or another, note whether the pointer is bent outward or is too far from the graduations so that appreciable paralax results. If there is a considerable variation, condemn the instrument. Also note if the pointer rubs anywhere. Hooks, rings, tags, etc., should not be hung on the hook or fastened under the pan or platform. If the pointer does not reach the base of the graduations, it is unfit for purposes of weighing. The graduations and figures shall be clearly and distinctly visible; if they are worn, blurred or erased, the instrument shall be condemned.

Note if the specifications are complied with, particularly the specifications relative to adjusting screws.

Testing. Place weights on the pan or platform or hang them on the hook and note whether the indications are correct. Do this up to the capacity of the scale.

When the load is removed, the pointer shall return quickly to zero.

The indications should be noted when the load is carefully applied and also after the spring is quickly shaken up or down. The movable part of the scale attached to the spring to indicate the weighings should be as nearly as possible dead beat, that is, does not vibrate back and forth a long time before coming to rest.

For any particular type of scale, test should be made by placing a load equal to the full capacity of the instrument on the pan and letting it remain there for 24 hours. This should not have affected the scale. If it does, the spring used by the manufacturer of this particular kind of scale is poor and other scales of that type should be tested as to this quality of spring. Scales which will not stand a 24-hour test should be condemned.

Shift the test weight equal to one-half the capacity of the scale to different parts of the platform. No change in the indications shall result. (See Specifications.)

If the pointer on a spring balance shows constant error, it may be correctly set by means of a pointer wrench, generally by removing the glass front, then loosening the screw in the tail end of the pointer, moving the pointer with the wrench to the proper place and then tightening the screw. Do this only on first inspection.

The maximum allowable variation and sensitiveness are the same as those allowed for counter scales. (See table, page —.

Sealing. Spring balances found to be correct shall be sealed as follows:

A dial or counter spring scale should have the gummed seal affixed in a conspicuous place. In addition the sealing die should be used where there is a plug or shield provided for sealing. A hand balance should be sealed with a steel stamp bearing the initial or initials of the city and the last two figures of the year.

Spring balances found faulty shall be condemned.

Note.—All spring scales of the straight front type on which the graduation face is not securely riveted to the frame are condemned.

Spring scales which are provided with a hanging pan and to which are attached additional rings or hooks other than the one attached to the hanging pan, are condemned.

Spring scales used for the sale of food stuff, except as elsewhere noted, of which the value of the graduation is more than one ounce, are condemned.

Scales, which are not provided with a device which will plainly show on the consumers' side of the scale the value of weight of the commodity purchased, are condemned.

Scales, having two hooks of different weights which can be attached to spring or scales having two hooks which register different weight on graduated face, according as object is placed on one or the other, such as are used by many junk dealers, shall invariably be condemned.

FAULTY SPRING SCALES LIKELY TO BE ENCOUNTERED.

1. Scales on which the hand or index marker does not point to zero when hook or pan is empty.
2. Scales of the straight front type on which the graduated face is not riveted to frame and can be raised or lowered while weighing is being done.
3. Scales having elastic bands attached to hook and frame so as to reinforce or retard action of spring itself.
4. Scales in which a stronger spring has been substituted for original spring or vice versa.
5. Scales on which pointer interferes with face which causes pointer to stop before indicating full value or weight.
6. Scales of the straight front type on which top

bolt or ring holding spring has been loosened and can be raised or lowered at will of operator.

7. Scales which carry extra hook attached to spring on which objects can be hung such as bills, etc.

8. *Scales having two hooks of different weights which can be attached to spring or scales having two hooks which register different weights on graduated face according as object is placed on one or the other.*

9. Balances having easily accessible adjusting screws by which position of pointer may be quickly and easily changed.

10. Hanging scales on which the bar to which the pan or hook is attached works hard in its slot or catches at certain points.

11. Spring scales with no dampering device, oscillating so freely and so long that there is a tendency to read the pointer before it comes to rest.

12. Objects attached to the hook, pan frame, beam or under the beam.

13. Scales with graduations so closely spaced that an accurate reading is impossible.

14. Scales of large capacity and consequently each division representing a considerable weight used to weigh small quantities, such as a 100-pound, 50-pound, or 25-pound spring scale used in the scale of commodities when generally not over one to five pounds are weighed in retailing meats, groceries, etc.

15. The spring weakened or drawn up too tight.

16. Straight front spring scales from which the spring has been removed.

17. Spring scales ostensibly showing weight on the customer's side but not so doing because no index line is provided.

18. Spring scales where the dealer's and customer's sides do not correspond.

COMPUTING SCALES.

Specifications. Computing scales must be correct in both their weight and value indications.

Charts which repeat the same values in any given column or row are incorrect. This also applies to charts on which value graduations are correctly placed but which in addition have a duplication of value figures in any given column or row.

The maximum value graduation on the chart must not exceed two cents.

On all scales equipped with a drum shaped chart the opening on the dealers' side must be such that at least two value indications at the lowest price per pound may always be visible. Computing scales must be so constructed that the ounce graduations and a figure representing the proper number of pounds will show on the customers' side when the load is placed on the pan or platform.

The distance between the chart and the reference mark must not exceed .06 inch. Reference marks must be present on both the dealers' and customers' side and their width must not exceed the width of the finest graduation on the chart. Both reference marks must indicate clearly and correctly.

The maximum value of the weight indications shall be 1 oz.

The width of the value indicator must not exceed the width of the value graduations.

On scales equipped with a magnifying device the clear interval between the weight and value graduations shall not be less than .02 inch. On scales not equipped with a magnifying device the clear interval between weight and value indications shall not be less than .04 inch.

All devices for adjusting shall be accessible or operative only by the use of an outside mechanical device.

The specifications as to the other parts of computing scales not modified by the above shall be the same as those of the class to which they belong.

Inspecting. There should be no readily adjustable parts. All indications should be clearly marked. A common fault of many computing scales is that they are set from ½ to 2 ounces fast. They are then wrong and should be condemned. The scale should clearly indicate zero when no load is on the pan. Note if the specifications are complied with, particularly as to the method of graduation and the presence of a clear, distinct indicating or reference mark or pointer. A scale with no reference mark or line, but only an opening, cannot be read and shall be condemned.

Testing. To test the accuracy of the pound and ounce values proceed as follows: Place a one-ounce weight upon the platform or pan and see whether the indications for one ounce are clearly shown on both the front (the dealer's side) and back (the customer's side) of the scale and whether these indications are correct. The index line, pointer, or reference mark must be sufficiently close to the indications that an appreciable error may not be introduced by the observer changing the position of his eye.

Repeat the same operation with an eight-ounce weight, with a one-pound weight, with a five-pound weight and then with the full capacity of the balance, in each case placing the weight not only in the center of the platform or pan but shifting it also to the edges. The indications in all of these cases should be correct.

It is very important to test the computing scales through a complete range of weight indications, as a great many show errors at different points of the scale and many of which may be correct at 0 show a falling off or increase somewhere within the range of the scale.

To test the correctness of the money values proceed as follows: Place a two-ounce weight upon the platform or pan and note the money indications at 4, 8, 10, 20 and 40 cents per pound; the first should show either one-half or no cents, the second should show one cent, the third should show one and one-quarter or approximately one-quarter between one and two cents, the next should show either two and one-half cents or approximately one-half way between two and three cents, and the last should show five cents. Place a one-half pound weight on the balance; the first money indication for the price per pound of the commodity noted above should show two cents, the next four cents, the next should show five cents, the next ten cents, the next twenty cents. Place two and one-half pounds upon the platform or pan; the money indicated for the price per pound of the commodity noted above should indicate in the first case ten cents, the next case twenty cents, the next case twenty-five cents, the next case fifty cents, the next case one dollar.

No column or row indicating money values for a commodity at a certain price per pound should have more than one value in each column or row indicating the money value at the price per pound. For instance a commodity sold at seven cents per pound should nowhere have in that column or row a duplication of values such as two 3's or two 4's. It is clearly impossible for two different weights of a commodity at the same price per pound to have the same value.

The allowable variations and sensitiveness shall be the same as prescribed under counter scales. (See table, page —).

Sealing. Sealing is done by stamping with the sealing die on a plate when provided, and also by affixing a gum seal on the front and back of some non-movable part of the scale.

Computing scales which do not comply with the above specifications or which are not correct in both weight indications and money indications should be condemned. A computing scale may be correct in its weight indications and incorrect in its money indications or vice versa. If it is correct in its weight indications but incorrect in its money indications, the sealer, on the first tour of inspection, should condemn the money indications by covering up the opening showing the money indications. If there are objections to this on the part of the dealer, the sealer shall condemn the scale as a whole.

Note.—Computing scales, with charts in which there is more than one figure of the same denomination in the same column or row at a given price per pound, are condemned.

The maximum value graduations on the chart shall not exceed two cents.

All scales provided with an adjusting screw and which can be adjusted without the use of a mechanical device, are condemned.

CREAM TEST AND BUTTER FAT TEST SCALES.

Specifications. The scale shall be provided with a graduated scale of at least ten divisions over which the pointer shall play.

The pointer must reach to the graduated divisions and shall terminate in a fine point to enable the readings to be made clearly and distinctly.

The clear interval between the divisions on the graduated face shall not be less than .05 inch.

The scale shall be provided with leveling screws and an attached level.

The scale shall be so constructed and adjusted that when the pans are released or disturbed the pointer will return to rest at the zero mark.

The addition of one-half grain to the scale when loaded to capacity shall cause a movement of the pointer at least equal to one division on the graduated face.

The tolerance either in excess or deficiency when the scale is fully loaded shall be one grain.

WEIGHTS.

Specifications. Weights shall be made of steel, iron, brass or any other metal or alloy of metals not softer than brass. Provided however, that weights below one-fourth ounce shall not be made of iron or steel but may be made of aluminum.

Weights must have smooth surfaces and no sharp points or corners.

Weights must not be covered with a soft or thick coat of paint or varnish.

All holes in which foreign material is placed for adjusting purposes must be so made that the bottom diameter is larger than the top diameter. The adjusting material must not project beyond the surface of the weight and must be securely held in place.

Rings on weights shall not be split or removable.

All weights shall be clearly marked to show their value and in addition weights intended to be used on multiplying lever scales must be clearly marked to show the weight they represent on the scale.

The tolerances allowed shall not exceed the values given in the following table:

TOLERANCES FOR COMMERCIAL WEIGHTS.

(Manufacturers' Tolerances or the Tolerances on new weights are one-half of the values listed.)

WEIGHT	ORDINARY WEIGHTS	COUNTERPOISE WEIGHTS FOR MULTIPLYING LEVER SCALES		
	(Ratio 1:1)	Ratio less than 100:1	Ratio 100:1 and less than 1000:1	Ratio 1000:1 and over
50 lb.	100 gr.	60 gr.	40 gr.	20 gr.
25	60	36	24	12
20	60	36	24	12
15	40	24	16	8
10	40	24	16	8
8	30	18	12	6
5	30	18	12	6
4	20	12	8	4
3	20	12	8	4
2	15	9	6	3
1	10	6	4	2
10 oz.	10	6	4	2
8	5	3	2	1
5	5	3	2	1
4	5	3	2	1
2	3	1.8	1.2	0.6
1	2	1.2	.8	.4
1/2	2	1.2	.8	.4
1/4	1.	.6	.4	.2
1/8	0.5	.3	.2	.1
1/16	.5	.3	.2	.1
1/32	.5	.3	.2	.1
1/64	.2	.12	.08	.04
Ratio of tolerances	5/5	3/5	2/5	1/5

The tolerances allowed on Apothecaries prescription weights shall not exceed the values given in the following table:

Oz. Troy	Tolerances	Weight	Tolerances
		10 kg.	2000 mg.
12	4 gr.	5	1500
10	4	2	800
8	3	1	500
5	3		
4	2	500 g.	350
3	2	200	200
2	2	100	150
1	1	50	100
		20	50
		10	40
Drachms		5	20
		2	15
		1	10
8	1.0 gr.		
6	1.0	500 mg.	6
4	0.7	200	6
3	.6	100	2.5
2	.5	50	2.0
1	.3		
Scruples			
3	0.3 gr.		
2	0.3		
1	0.15		
Grains			
gr			
20	.15 gr.		
15	.15		
10	.10		
5	.08		
1	.03		

Testing. Weights of five pounds or less should be tested by comparing them with the working standards on the sealer's portable balance. Larger weights may be tested on a scale or balance that has been found to be correct and sufficiently *sensitive* to clearly indicate the errors as small as those indicated in the specifications above.

Sealing. Weights which are found to be correct should be stamped on the top of the weight and also on the leaded plug or plugs, if there be such. Use either large or small steel die, depending upon the size of the weight. If the weight is incorrect and cannot be adjusted, stamp it with the condemning stamp. It is best to get the owners permission to take the weight, if the case does not warrant instituting legal proceedings.

Important. *Every weight shall be tested. The* *mere fact that it has some designation marked, stamped, engraved or cast on it is no warrant of its correctness; for example, not every piece of cast iron with "5 lbs." cast in its surface weighs five pounds.*

KINDS OF FAULTY WEIGHTS LIKELY TO BE ENCOUNTERED.

The most prevalent forms of incorrect weights are the following:

1. Weights old, rusty or worn.
2. Weights that have been drilled or part sawed or chipped off to decrease their weight.
3. Lead-filled, zinc, or brass cased weights, that have come apart and the bottom or part of the filling lost.
4. Knob weights with the knob broken off or replaced by another.
5. Hollow weights with loose filling, part of the filling having been removed.
6. Weights with lead plugs, the plugs removed or scraped.
7. Cheap cast weights which even when new have never been adjusted.

Rules Regulating the Sale of Commodities in Indiana.

Under Section 2, the State Commissioner of Weights and Measures is given authority to issue regulations which shall govern the procedure to be followed by county and city inspectors of weights and measures. The following rules are issued under this authority:

Rule 1. **Butters.** Butter, butterine, and oleomargine, etc., unless sold by weight shall not be sold or offered for sale in the State of Indiana in the form of prints, rolls, tubs, etc., which are not marked in bold faced type on the outside of the wrapper or container, the net avoirdupois weight in pounds or ounces.

Rule 2. **Lard.** Lard, unless sold by weight shall not be sold or offered for sale in the State of Indiana in pails or containers which are not marked in bold faced type on the outside of the pail or container the net avoirdupois weight in pounds or ounces.

Note.—Butter, lard, etc., must be sold by net weight. Sale by gross weight, including the tray, carton or pail is in violation of the law.

Rule 3. **Flour.** Wheat flour, buckwheat flour, gluten flour, rye flour, graham flour, corn meal, etc., unless sold by weight, shall not be sold or offered for sale in the State of Indiana in the form of sacks, bags or containers, etc., which are not marked in bold faced type on the outside of the sack, bag or container the net avoirdupois weight in pounds or ounces.

Rule 4. **Cereals.** Oatmeal, corn flakes, breakfast foods, in packages, etc., unless sold by weight, shall not be sold or offered for sale in the State of Indiana in boxes, packages or containers which are not marked in bold faced type on the outside of the box, package or container, the net avoirdupois weight in pounds or ounces.

Rule 5. **Coffee.** Coffee, tea, etc., unless sold by weight, shall not be sold or offered for sale in the State of Indiana in cans, packages, bags, containers, etc., which are not marked in bold faced type on the outside of the can, package, bag or container, etc., the net avoirdupois weight in pounds or ounces.

Rule 6. **Baked Food Stuffs.** Cookies, crackers, wafers, ginger snaps, etc., unless sold by weight shall not be sold or offered for sale in the State of Indiana in boxes, bags, containers, etc., which are not marked in bold faced type on the outside of the box, bag, container, etc., the net avoirdupois weight in pounds or ounces, or in case of cookies, crackers, etc., which are usually and customarily sold by numerical count, the number of cookies, crackers, etc., shall be plainly marked on the outside of the box, bag or container.

Rule 7. **Fruit.** Apples, peaches, pears, oranges, lemons, etc., unless sold by standard weight or measure, shall not be sold or offered for sale in the State of Indiana in baskets, boxes or crates which are not marked in bold faced type on the outside of the basket, box or crate, etc., the net avoirdupois weight in pounds or ounces or standard measure; or in the case of oranges, apples, lemons, etc., which are usually and customarily sold by numerical count, the number of apples, oranges, lemons, etc., shall be plainly marked on the outside of the basket, box or crate, etc.

Rule 8. **Vegetables.** Potatoes, sweet potatoes, turnips, onions, etc., unless sold by weight, shall not be sold or offered for sale in the State of Indiana, in bags, baskets, boxes, crates, etc., which are not marked in bold faced type on the outside of the bag, basket, box, crate, etc., the net avoirdupois weight in pounds or ounces or standard measure.

Rule 9. **Small Fruits.** Raspberries, strawberries, blackberries, plums, etc., shall not be sold or offered for sale in the State of Indiana in boxes or containers which are not of the standard dry quart or pint.

Rule 10. **Candy.** Candies unless sold by weight shall not be sold or offered for sale in the State of Indiana in boxes or containers which are not marked in bold faced type on the outside of the box or container the net avoirdupois weight in pounds or ounces, or in case of stick or other candies which are usually and customarily sold by numerical count the number of sticks or pieces shall be plainly marked on the outside of the box or container.

Rule 11. **Beverages.** Beer, wine, whisky, ale, sodas, pops, etc., shall not be sold or offered for sale in the State of Indiana in bottles the contents of which are not marked in bold faced type on the outside of the bottle in terms of quarts, pints and half pints or in terms of fluid ounces.

Rule 12. **Salt.** Salt, unless sold by weight, shall not be sold or offered for sale in the State of Indiana in bags or packages which are not marked in bold faced type on the outside of the bag or package, the net avoirdupois weight in pounds or ounces.

Rule 13. **Dry Commodities.** Dry commodities, such as beans, peas, corn, seeds, cranberries, etc., shall not be sold or offered for sale in the State of Indiana by liquid measure.

Rule 14. **Dried Fruits.** Dried fruits such as prunes, peaches, dates, figs, apricots, etc., unless sold by weight, shall not be sold or offered for sale in the State of Indiana in boxes, packages, containers, etc., which are not marked in bold faced type on the outside of the box, package, container, etc., the net avoirdupois weight in pounds or ounces.

Rule 15. **Syrups and Molasses.** Maple syrups, sugar syrups, sugar cane syrups, etc., unless sold by standard weight or measure, shall not be sold or offered for sale in the State of Indiana in bottles, cans, containers, etc., which are not marked in bold faced type on the outside of the bottle, can, container, etc., the net avoirdupois weight in pounds or ounces or in terms of gallons, quarts, pints and half pints or fluid ounces.

Rule 16. **Commodities in Bottles, Cans and Jars.** Commodities such as pickles, catsup, jams, fruit butters, jellies, preserves, canned fruits, peanut butter or canned meats, etc., unless sold by standard weights or measure, shall not be sold or offered for sale in the State of Indiana in bottles, cans or jars which are not marked in bold faced type on the outside of the bottle, can, jar, etc., the net avoirdupois weight in pounds or ounces, or in case of pickles, etc., which are usually and customarily sold by numerical count, the number of pickles, etc., shall be plainly marked on the outside of the bottle, can or container.

Rule 17. **Dry Goods.** All piece goods, except such ready-to-wear articles as millinery, notions, neckwear, etc., which may be sold by numerical count, must not be sold or offered for sale in the State of Indiana except by linear measure, and the marking in yards, feet or inches must be in bold faced type on the outside of the package, bolt, etc.

Rule 18. **Yarns.** Woolen yarn, cotton yarn, etc., unless sold by weight or linear measure, shall not be sold or offered for sale in the State of Indiana in packages, skeins, balls, etc., which are not marked in bold faced type on the outside of the package, skein, ball, etc., the net avoirupois weight in pounds or ounces or in linear measure.

Rule 19. **Commodities** which appear as a unit in the state of nature may be sold either by weight, measure or count. As an illustration, eggs may be sold by count or the dozen. Comb honey may be sold by the comb, but where the container containing these individual units containing more than six, it must be marked; for instance, egg carriers, if there are over six eggs in a carrier, must be marked with the number of eggs contained therein in bold faced type on the outside or top of the carrier or container.

Rule 20. **Spices.** Pepper, cinnamon, cloves, ginger, etc., unless sold by weight, shall not be sold or offered for sale in the State of Indiana in boxes, cans, packages, sacks, containers, etc., which are not marked in bold faced type on the outside of the box, can, package, sack, container, etc., the net avoirdupois weight in pounds or ounces.

Rule 21. **Flavoring Extracts.** Vanilla extract, lemon extract, ginger extract, orange extract, peppermint extract, etc., unless sold by standard weight or measure shall not be sold or offered for sale in the State of Indiana in bottles, jars, cans, etc., which are not marked in bold faced type on the outside of the bottle, jar, can, etc., the net avoirdupois weight in pounds or ounces or in terms of gallons, quarts, pints, half pints or in fluid ounces.

Rule 22. **Oils.** Olive oil, cotton seed oil, cocoanut oil, etc., unless sold by standard weight or measure shall not be sold or offered for sale in the State of Indiana in cans, bottles, jars, barrels, etc., which are not marked in bold faced type on the outside of the can, bottle, jar, barrel, etc., the net avoirdupois weight in pounds or ounces or in terms of gallons, quarts, pints, half pints or fluid ounces.

Rule 23. **Fruit Juices.** Apple juices, grape juices, lemon juices, etc., unless sold by standard weight or measure, shall not be sold or offered for sale in the State of Indiana in bottles, cans, jars, jugs, barrels, etc., which are not marked in bold faced type on the outside of the bottle, can, jar, jug, barrel, etc., the net avoirdupois weight in pounds or ounces or in terms of gallons, quarts, pints, half pints or fluid ounces.

Rule 24. **Oils and Paints.** Oils, white lead, prepared paint, varnish, linseed oil, etc., unless sold by standard weight or measure, shall not be sold or offered for sale in the State of Indiana in bottles, cans, kegs, barrels, etc., which are not marked in bold faced type on the outside of the bottle, can, keg or barrel, etc., the net avoirdupois weight in pounds or ounces or in the terms of gallons, quarts, pints, half pints or fluid ounces.

Rule 25. **Vinegars.** Cider vinegar, distilled vinegar, malt vinegar, etc., unless sold by standard weight or measure shall not be sold or offered for sale in the State of Indiana in bottles, kegs, barrels, etc., which are not marked on the outside of the bottle, keg, barrel, etc., in bold faced type the net avoirdupois weight in pounds or ounces or in terms of gallons, quarts, pints, half pints or fluid ounces.

Rule 26. **Coal.** Hard coal, soft coal, coke, etc., unless sold by standard weight, shall not be sold or offered for sale in the State of Indiana in baskets, boxes, bags, wagon boxes, etc., unless a certificate be delivered to the consumer by the person selling the coal plainly showing the number of pounds or ounces contained in said basket, box, bag, wagon box, etc.

Rule 27. **Lime and Cement, Hair, etc.** Unless sold by standard weight or measure shall not be sold or offered for sale in the State of Indiana in sacks, bags, barrels, etc., which are not marked in bold faced type on the outside of the sack, bag or barrel, etc., the net avoirdupois weight in pounds or ounces.

Rule 28. **Wood.** Slab wood, etc., unless sold by standard measure, shall not be sold or offered for sale in the State of Indiana by the rank load, pile, bundle, etc., unless a certificate be delivered to the consumer plainly showing the number of cubic feet in said load.

Rule 29. **Cheese.** Cheese, unless sold by weight, shall not be sold or offered for sale in the State of Indiana in boxes or containers, etc., which are not marked in bold faced type on the outside of the box, container, etc., the net avoirdupois weight in pounds or ounces. The weight shall be the actual weight at the time of delivery.

Rule 30. **Canned Goods.** Corn, tomatoes, peaches, plums, etc., shall not be sold or offered for sale in the State of Indiana in cans, bottles, jars, etc., which are not marked in bold faced type on the outside of the can, bottle, jar, etc., the net avoirdupois weight in pounds or ounces or in terms of gallons, quarts, pints, half pints or in fluid ounces.

Rule 31. **Cured meats.** Hams, bacons, dried beef and smoked or cured meat products, unless sold by weight, shall not be sold or offered for sale in the State of Indiana in paper, cloth, burlap or other wrapping material unless the net avoirdupois weight in pounds or ounces is marked in bold faced type on the outside of the wrapper in which the meat is contained.

MODEL AFFIDAVIT.

State of Indiana, Marion County, ss.
STATE OF INDIANA,
vs:
JOHN DOE

Richard Roe, being duly sworn upon his oath, says that on the 15th day of July 1913 in the county of Marion and State of Indiana one John Doe did then and there unlawfully offer and expose for sale and sell to one Richard Roe a certain quantity of coal at and for the price of four dollars which said quantity of coal he, the John Doe, did then and there represent to the said Richard Roe to be one ton of coal, when in truth and in fact said quantity of coal was less than one ton, to wit: 1,840 pounds, 12 ounces (1,840 lbs. 12 oz.) and no more, then and there being contrary to the form of the statutes in such case made and provided, and against the peace and dignity of the State of Indiana.

Richard Roe.

Subscribed and sworn to before me, this 18th day of July, 1913.

....

BRIEF REFERENCE TABLES FOR INSPECTORS.

United States Linear Measure.

12 inches (in.)=1 foot (ft.).
3 ft.=1 yard (yd.)=36 inches.
5½ yards=1 rod (rd.)=16½ feet.
320 rods=1 mile (mi.)=1760 yards=5280 feet.

Chain Measure.

7.92 inches=1 link (li.).
100 li.=1 chain (ch.)=66 feet.
80 ch.=1 mile (mi.).

The engineer's chain is 100 feet long and consists of 100 links.

Square Measure.

144 square inches (sq. in.)=1 square foot (sq. ft.).
9 sq. ft.=1 square yard (sq. yd.).
30¼ sq. yd.=1 square rod (sq. rd.).
160 sq. rd.=1 acre (a.).

Surveyor's Measure.

625 square links (sq. li.)=1 square rod (sq. rd.).
16 sq. rods=1 square chain (sq. ch.).
10 sq. ch.=1 acre (a.).
640 a.=1 square mile (sq. mi.).
36 sq. mi. (6 mi. sq.)=1 township (tp.)=23040 a.

Cubic Measure.

1728 cubic inches (cu. in.)=1 cubic foot (cu. ft.).
27 cu. ft.=1 cubic yard (cu. yd.).

United States Liquid Measure.

4 gills (gi.)=1 pint (pt.).
2 pt.=1 quart (qt.)=8 gills.
4 qt.=1 gallon (gal.) 8 pints=32 gills.
31½ gal.=1 barrel (bbl.)=126 quarts.
2 bbl.=1 hogshead (hhd.)=63 gallons=252 qts.

Apothecaries' Fluid Measure.

60 minims (m.)=1 fluid dram (fl. dr.).
8 fl. dr.=1 fluid ounce (fl. oz.)=480 minims.
16 fl. oz.=1 pint (O.)=128 fl. dr.=7680 m.
8 O.=1 gallon (cong.)=128 fl. oz.=1024 fl. dr.

U. S. Dry Measure.

2 pints (pt.)=1 quart (qt.).
8 qt.=1 peck (pk.)=16 pints.
4 pk.=1 bushel (bu.)=32 quarts=64 pints.

Avoirdupois Weight.

27 11/32 grains (gr.)=1 dram (dr.).
16 dr.=1 ounce (oz.)=437½ grains.
16 oz.=1 pound (lb.)=156 drams=7000 grains.
100 lbs.=1 hundredweight (cwt.)=1600 ounces.
20 cwt.=1 ton (t.)=2000 pounds.

Troy Weight.

24 grains (gr.)=1 pennyweight (dwt.).
20 dwt.=1 ounce (oz.)=480 grains.
12 oz.=1 pound (lb.)=240 dwt.=5760 gr.

Apothecaries' Weight.

20 grains (gr.)=E scruple (℈).
3 ℈=1 dram (ʒ)=60 grains.
8 ʒ=1 ounce (℥)=24 ℈=480 grains.
12 ℥=1 pound (lb.)=93 ʒ =288℈=5760 gr

Liquid Measure.

Number of cubic inches in U. S. Standard capacity measures:

1 gallon contains 231 cu. in.
½ gallon contains 115.5 cu. in.
1 quart contains 57.75 cu. in.
1 pint contains 28.875 cu. in.
½ pint contains 14.437 cu. in.
1 gill contains 7.218 cu. in.
1 fluid oz. contains 1.804 cu. in.
1 dram contains .225 cu. in.

Dry Measure.

1 bushel contains 2150.42 cu. in.
½ bushel contains 1075.21 cu in.
1 peck contains 537.60 cu. in.
½ peck contains 268.80 cu. in.
¼ peck contains 134.40 cu. in.
1 quart contains 67.20 cu. in.
1 pint contains 33.60 cu. in.
½ pint contains 16.80 cu. in.

The Metric System.

The metric system is based on a unit of length (the *meter*). A cubic box one-tenth of a meter on the side is the unit of capacity, a *liter*, and the water contained in a liter weighs one kilogram. The unit of weight, the *gram*, in the metric system is the weight of water contained in a cubical box one-hundredth of a meter on a side. (Note: These values are not precisely correct but hold for all but the most refined measurements.)

The entire system is then built up by multiplying or dividing the unit by ten, one hundred and one thousand, using always the same prefix to indicate what the unit is multiplied or divided by, thus:

milli means 1/1000 or divided by 1,000.
centi means 1/100 or divided by 100.
deci means 1/10 or divided by 10.
deka means 10 or multiplied by 10
hecto means 100 or multiplied by 100
kilo means 1,000 or mutiplied by 1,000.

The tables then become:

Length.

10 millimeters=1 centimeter.
10 centimeters=1 decimeter.
10 decimeters=1 meter.
10 meters=1 dekameter.
10 dekameters=1 hectometer
10 hectometers=1 kilometer.

Weight.

10 milligrams=1 centigram.
10 centigrams=1 decigram.
10 decigrams=1 gram.
10 grams=1 dekagram.
10 dekagrams=1 hectogram.
10 hectograms=1 kilogram.

Capacity.

10 milliliters=1 centiliter.
10 centiliters=1 deciliter.
10 deciliters=1 liter (1 cubic decimeter).
10 liters=1 dekaliter.
10 dekaliters=1 hectoliter.
10 hectoliters=1 kiloliter.

In the metric system there is but one standard of weight, one standard of measure for liquids and dry commodities alike, and but one standard of length.

A Few Useful Equivalents.

	Approximate equivalents
1 centimeter=.394 inch.	$\frac{4}{10}$
1 inch=2.54 centimeters.	$2\frac{1}{2}$
1 yard=.914 meter.	$\frac{9}{10}$
1 meter=39.37 inches	$39\frac{1}{3}$
=1.09 yards.	$1\frac{1}{10}$
1 kilometer=.621 mile	$\frac{5}{8}$
mile=1.61 kilometers.	$1\frac{6}{10}$
1 nail=$2\frac{1}{4}$ inches.	
1 palm=3 inches.	
1 hand=4 inches.	
1 barley-corn=$\frac{1}{3}$ inch.	
1 span=9 inches.	
1 cubit=18 inches.	
1 pace=3 feet.	
1 hairsbreadth=$\frac{1}{48}$ inch.	
1 dry quart=1.164 liquid quart (U. S.)	$1\frac{1}{6}$
=67.2 cubic inches.	
1 liquid quart=.859 dry quart (U. S.)	$\frac{6}{7}$
=57.75 cubic inches.	
1 liter=1.056 liquid quarts (U. S.).	$1\frac{1}{20}$
=.908 dry quart (U. S.)	$\frac{9}{10}$

1 cubic inch=4.43 fl. dr.	$4\frac{1}{2}$
1 cubic meter=1.308 cubic yards.	$1\frac{1}{3}$
1 cubic yard=21.696 bushels (U. S.).	$21\frac{2}{3}$
=.765 cubic meter.	$\frac{3}{4}$
1 fluid dram=.226 cu. in.	$\frac{1}{4}$
1 hectoliter=26.42 gallons (U. S.)	$26\frac{1}{2}$
2.84 bushels (U. S.).	$2\frac{6}{7}$
1 cord (firewood)=4 x 4 x 8 ft.	
1 barrel refined oil=42 gallons.	
1 heaped bushel=$1\frac{1}{4}$ struck bushel or ordinary bushel.	
1 firkin butter=56 pounds.	
1 gallon of water weighs 8.323 pounds.	
1 gram=15.43 grains.	$15\frac{1}{2}$
1 miligram=.0154 grains.	$\frac{2}{130}$
1 grain=64.8 miligrams.	65
1 ounce (Av.)=28.35 grams.	$28\frac{1}{3}$
1 kilogram=2.205 pounds (Av.).	$2\frac{1}{5}$
1 pound (Av.)=.454 kilogram.	$\frac{9}{20}$
1 ton=907.185 kilograms.	900
1 metric ton=2204.62 pounds (Av.).	2200
1 long ton=2240 pounds.	
1 caret=3.171 grains (varies considerably).	

To find the diameter of a circle from the circumference divide the circumference by 3.1416.

To find the *capacity of a rectangular box or bin:* Multiply the length by the breadth by the depth or height. The three dimensions must be in the same units.

Example: A bin is 6 ft. wide, 5 ft. 6 in. deep and 8 ft. 3 in. long. Its capacity is $6\times5\frac{1}{2}\times8\frac{1}{4}=272\frac{1}{4}$ cubic feet.

To find the *capacity of a cylindrical measure or box, or bin:* Multiply the diameter by the diameter by 3.1416 by the height and divide by 4.

Example: If a cylindrical measure is 13 inches in diameter and 6 inches in depth, its capacity is $(13\times13\times3.1416\times6)\div4=796.39$ cubic inches.

Find the approximate capacity of a barrel of dimensions different from those given in the statutes by measuring the mean diameter and depth. Example: A barrel is 25 inches between the heads inside. The inside diameter of the top and bottom is 18 inches and the inside diameter at the center is 20 inches. Find the capacity. The average diameter is approximately $\frac{1}{2}$ of the diameter of the ends and of the center, or $(18'' + 20'')\div2=19$ inches. Then proceed as in the case of a cylinder.

$(19\times19\times3.1416\times25)\div4=7088.2$ cu. in.

The approximate *capacity of a berry box* which has sloping sides can be found by adding the area of the top and the area of the bottom and dividing by 2 and then multiplying by the depth.

Example: A berry box is 5.1×5.1 inches on top; 4.37×4.37 inches at the bottom, and 2.93 in depth, the content is $[(4.37 \times 4.37) + (5.1 \times 5.1)] \times 2.93 \div 2 = 66.1$ cubic inches.

To find the *capacity of a berry box* more exactly, find the area of the top and the area of the bottom, and the perpendicular depth. Then multiply one-third of the height by the sum of the top area plus the bottom area plus the square root of the product of the two areas.

Example: A berry box is 5.1 inches on the side at the top and 4.37 inches on the side at the bottom. The depth is 2.93 inches, then $\frac{1}{3} \times 2.93 \{ [(4.37 \times 4.37) + (5.1 \times 5.1)] + \sqrt{[(4.37 \times 4.37) \times (5.1 \times 5.1)]} \} = 65.8$ cubic inches.

To find the *number of tons of coal in a bin,* find the number of cubic feet it occupies and multiply by the weight of a cubic foot of coal and divide by 2,000.

Example: Average nut coal weighs about 52 pounds to the cubic foot of coal. If a rectangular bin is 5 feet wide and 8 feet 6 inches long and filled evenly to a depth of 4 feet, there will be: $5 \times 8\frac{1}{2} \times 4 = 170$ cubic feet of coal, or $(170 \times 52 \div 2000 = 4.42$ tons of coal.

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